



Landfill Closure Guidance

Solid Waste Management Program technical bulletin

7/2003

The Missouri Department of Natural Resources' Solid Waste Management Program (SWMP) has developed this technical bulletin to provide assistance to landfill owners, operators and engineers in obtaining closure approval from the department. This bulletin was prepared to provide guidance for closure under Missouri Solid Waste Management law and rules.

All owners or operators applying for closure approval must have a department approved closure/post-closure plan. For further information regarding the preparation of closure/post-closure plans, see SWMP's technical bulletin entitled *Guidance For Preparing Solid Waste Disposal Area Closure and Post-Closure Plans* or contact SWMP at (573) 751-5401.

1. Closure Schedule

- A. Notify the SWMP in writing of intentions to cease taking waste 180 days prior to anticipated closing date.
- B. Implementation of closure must begin within 30 days of last receipt of waste.
- C. Closure must be completed within 180 days of the initiation of closure activities. Time extensions may be granted by SWMP. To request an extension the owner or operator must submit a written request to SWMP within at least 30 days of the closure deadline and include a proposed schedule for completing closure. Extensions will only be granted on a case-by-case basis. However, the owner or operator must have made considerable efforts in previously closing the landfill.

2. Final Closure Guidance

As each phase of the landfill is completed, final cover must be applied. A good final cover will help minimize surface water infiltration and subsequent leachate production as well as minimize gas migration produced by decomposing waste. Following are descriptions of the various components of a final cover.

- A. Landfills Without Composite Liners
 - 1. Two feet of compacted soil classified as CH, CL, ML, SC or MH as per ASTM method D-2487.
 - 2. One foot of vegetative soil.
- B. Landfills With Composite Liners
 - 1. One foot of compacted soil classified as CH, CL, ML, SC or MH as per ASTM method D-2487.



2. Geomembrane, equal to that of liner, at least 30 mil thick or 60 mil for HDPE liners.
3. Lateral drainage layer must be constructed between the vegetative soil and the underlying geomembrane.
4. Two feet of vegetative soil.

Note: All borrow area soil used for cover construction must be tested by a professional engineer or their agent to ensure the soil meets the approved standards as per 10 CSR 80-3.010.

3. Construction and Grading

When constructing the final cover a strict Quality Assurance/ Quality Control (QA/QC) plan must be followed to ensure the cover is not damaged in any way.

- A. Final contours of the closed landfill shall not exceed the originally approved permitted final contours unless approval is granted by the department.
- B. The compacted soil layer shall be constructed in 6 inch to 8 inch lifts until the desired thickness is achieved. The compacted soil must be covered so as to prevent damage from drying and cracking.
- C. Side slopes shall not exceed permitted grade or 3:1 (horizontal: vertical), whichever is less. Those areas that require the placement of a geomembrane as a component of final cover must not be allowed to erode or cause slope failure. It is recommended in these cases that the slope be decreased.
- D. Terracing and letdown structures shall be constructed to prevent erosion and to control stormwater, as called for in a department approved closure plan.

4. Vegetation

Once the cover has been applied, the top surface of the landfill must be vegetated. This is important for several reasons. A good healthy stand of vegetation helps control erosion of the topsoil from surface water runoff and wind as well as helps minimize the infiltration of stormwater into the landfill and subsequent leachate production. Following are some guidelines for establishing a good stand of vegetation.

- A. Methods to establish vegetation:
 1. The department recommends a hardy grass or legume mixture be used such as fescue (75 pounds/acre) and clover.
 2. Soil testing of the vegetative layer for proper application of lime, fertilizer and other soil conditioning.
 3. The application of mulch must be utilized during the time vegetation is to be established. Mulch is used to help prevent slope erosion, conserve soil moisture, prevent seed from being washed or blown away as well as prevent weed growth.

Acceptable mulching materials include, but are not limited to, straw, hay or fiber. However, sawdust or chipped wood is not a suitable material for use as mulch.

B. The department considers that a good stand of healthy vegetation is one that controls and prevents erosion and provides vegetative cover of at least 80 percent of any square foot evaluated by department personnel. The department reserves the right to determine whether or not vegetation has been adequately established before closure is approved.

5. Submittals for Closure Approval

Before closure can be approved, three copies of the following documentation must be submitted.

A. Certification by a professional engineer registered in Missouri that closure has been completed in accordance with an approved closure plan. The certification must include

1. As-built drawings of the landfill. These drawings must include final contours of the landfill, vertical and horizontal limits of waste placement and any environmental control systems at the landfill. (The survey plat referenced below may be included on the as-built drawings, eliminating the need for two separate drawings.)
2. Evidence that final cover components have been verified for depth and types of cover soils on 100 foot centers and identified on the as-built drawings.
3. Evidence that a dense stand of hardy vegetation has been established as per SWMP requirements, section 4. B. of this document.

B. A survey plat prepared by a licensed surveyor registered in Missouri must be submitted upon completion of closure. The plat must contain the following information at a minimum:

1. The name of the property owner as it appears on the property deed.
2. A survey and detailed legal description of the waste limits, the permitted area and the property boundary.
3. The general types, locations and depths of wastes within the property.
4. The location of any environmental control systems in place at the landfill and the length of time these systems and the landfill are to be maintained.
5. The location of all boundary markers and benchmarks located at the site.

Note: Filing of Survey Plat:

1. Within 30 days of department approval of the plat, the owner or operator shall file the plat with the county recorder of deeds.
2. Two copies of the recorded plat shall be submitted to the department within 30 days of the filing.

C. Owners or operators of solid waste disposal areas permitted prior to Jan. 1, 1987 and which close after Jan. 1, 1989 as part of closure must

1. Execute an easement with the department or its agents to enter the site to monitor, maintain, or take remedial action during the 30 year post-closure period.
2. Submit evidence to the department that a notice and covenant running with land has been filed with the county recorder of deeds. The notice and covenant shall specify the following:
 - A. The property has been permitted as a sanitary landfill.
 - B. That use of the land which interferes with the closure/post-closure plan is prohibited.

The SWMP has prepared the attached standard form entitled *Agreement for Easement, Notice and Covenant Running With Land* that must be submitted upon completion of closure. This form should be completed concurrently with the survey plat.

6. Closure Approval/Denial

Upon completion of the above closure activities, the permittee must request from the SWMP approval for final closure of the landfill and that closure funds be released.

- A. The SWMP will conduct a final closure inspection to verify that all the requirements for closure have been met.
- B. The SWMP will either approve or deny the request for closure approval. If the request is approved, closure funds will be released. If the request is denied, a letter will be sent to the permittee outlining the deficiencies for closure and time frames for compliance.

7. Recommended Guidance

- A. Missouri Department of Natural Resources technical bulletin *Guidance For Preparing Solid Waste Disposal Area Closure and Post-Closure Plans*.
- B. U.S. Environmental Protection Agency report *Standard Procedures For Planting Vegetation On Completed Sanitary Landfills*.
- C. University of Missouri Extension Services document *How to Get A Good Soil Sample*.
- D. University of Missouri Extension Services document *Using Your Soil Test Results*.

For more information

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